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Aircraft Engine Emissions

Presented by
The International Civil Aviation Organization

UNITED NATIONS ENVIRONMENT PROGRAMME

OZONE LAYER CONFERENCE

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AIRCRAFT ENGINE EMISSIONS

(Presented by the International Civil Aviation Organization)

1. The nature and responsibilities of ICAO

1.1 The International Civil Aviation Organization (ICAO) is the specialized agency of the United Nations which deals with aviation matters. Its Member States at present number 135. The Chicago Convention on International Civil Aviation (1944) agreed on the principles by which international civil aviation could be developed in a safe and orderly manner and ICAO was the permanent body established to administer these principles.

1.2 The Organization's principal means of discharging this responsibility in the technical and operational areas of aviation is the publication of annexes to the Chicago Convention. These annexes contain internationally agreed specifications covering such subjects as operation of aircraft, rules of the air, personnel licensing, communications, and airworthiness. The specifications are in the form of Standards and Recommended Practices. All Contracting States to the ICAO Convention undertake to incorporate Standards into their national codes. However, if they do not wish to do so in a particular case, they must file a difference with ICAO, which must then be published for the information of the other States.

1.3 In addition to the annexes to the Chicago Convention, ICAO also publishes many other kinds of documents. Some of these are directly connected to specific annexes and take the form of supporting guidance material to assist States in implementing the intentions of the Standards and Recommended Practices.

1.4 In the environmental field, Annex 16 dealing with aircraft noise was published in 1972, culminating several years of intense effort. In addition, circulars have been published on such subjects as "Noise Assessment for Land-Use Planning" (Circular 116-AN/86) and "Guidance Material on SST Aircraft Operations" (Circular 126-AN/91).

2. Liaison with WMO and WHO

2.1 ICAO has been actively supporting the World Meteorological Organization (WMO) programme to investigate stratospheric pollution, including the effects of man's activities on the ozone layer. As the organization responsible for international civil aviation, ICAO stands ready to supply WMO with authoritative operational data as required by that Organization for its studies, such as the information already provided on supersonic aircraft exhaust emissions.

2.2 With regard to the World Health Organization (WHO), ICAO has established liaison with that Organization's section for Control of Environmental Pollution and Hazard and maintains contact with it on programmes of mutual interest--particularly those relating to the effects of aircraft engine exhaust emissions in the vicinity of airports.

3. ICAO activity in environmental matters to date

3.1 Annex 16 to the Chicago Convention contains specifications relating to aircraft noise. Continuing work on this subject, including the updating of this annex, is carried out by an advisory body of ICAO, the Committee on Aircraft Noise. ICAO has also published a circular, "Noise Assessment for Land-Use Planning" (Circular 116-AN/86), which provides descriptions of various methods used in the assessment of noise exposure and a comparison of these methods.

3.2 A circular entitled "Guidance Material on SST Aircraft Operations" (Circular 126-AN/91) has been published which contains, among other things, information regarding sonic boom and its avoidance. This subject remains under consideration by another ICAO advisory body, the Sonic Boom Committee.

3.3 To consider the question of possible atmospheric pollution by aircraft, a study was initiated in 1973 by the Secretariat, assisted by a group of experts from States. These efforts were directed towards aircraft engine emissions in the vicinity of airports and consisted of:

a) fact finding on relevant technical and regulatory developments in States;

b) the development of specifications for units and methods of measurement of engine emissions;

c) a study of the need for a certification scheme to control engine emissions; and

d) the formulation of proposals for implementation of such a scheme if it were found necessary.

3.4 It was concluded that, although at present aircraft engine emissions do not pose a serious pollution problem except at a few particular airfields, a certification scheme for control of such emissions was desirable. This was because other sources of emissions at airports, chiefly ground vehicles, were being controlled and consequently aircraft would contribute an increasingly significant proportion of pollution if left uncontrolled. It was also recognized that early action before a real problem developed would enable engine designers to plan for low emission engines and avoid any future need for retrofitting with "cleaner" engines.

3.5 Work has therefore been continuing on proposals for a certification scheme for the control of engine emissions, including smoke, vented fuel and gaseous emissions as well as full specifications for instrumentation and measurement procedures. Substantial progress has been achieved in this work and it can be expected that the initial results will see publication in the near future. This material will initially be restricted to turbo-jet and turbo-fan engines used for propulsion of aircraft at subsonic speeds, but will likely be extended to other classes of engines in due course.

3.6 Although the work has been specifically directed towards emissions at low altitudes, the existence has been recognized of a potential high altitude pollution problem which should be kept in sight when the low altitude question is being addressed. Investigation into upper atmosphere pollution is of great interest to ICAO, and should it confirm that aircraft might be a significant contributory factor, ICAO would wish to take steps to alleviate the problem at the earliest possible moment.

3.7 Besides the work on engine emissions outlined above, ICAO has also been considering the need and possibility of controlling emissions at airports by operational means. Such procedures as the delayed start-up of engines before take-off and early shut-down after landing are being considered as ways of reducing taxiing time and therefore emissions.

4. Future activity by ICAO

4.1 In fulfilling its role in the development of international civil aviation, ICAO is conscious of the adverse environmental impacts which may stem from aircraft operations. It is also conscious of its responsibility and that of its Member States to achieve the maximum compatibility between the safe and orderly development of civil aviation and the quality of the human environment.

4.2 In discharging this responsibility ICAO will continue to cooperate with States and other international organizations in studying questions, as they arise, regarding the impact of civil aviation on the environment.

4.3 It is hoped that if potential environmental problem areas are identified at an early stage, then designers can be given time to incorporate technology into new equipment which will avoid or minimize such problems. ICAO's work to minimize the disruptive and costly effect of retroactive regulations is also mentioned in the paper submitted by the United Nations Department of Economic and Social Affairs.

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